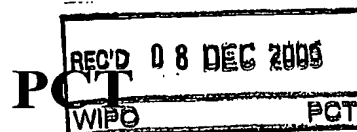


# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
LISA A. HAILE, J.D., PH.D.  
DLA PIPER RUDNICK GRAY CARY US LLP  
4365 EXECUTIVE DRIVE, SUITE 1100  
SAN DIEGO, CA 92121-2133



## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) <b>05 DEC 2005</b>	
<b>FOR FURTHER ACTION</b> See paragraph 2 below	
Applicant's or agent's file reference <b>UCLA1540WO</b>	
International application No. <b>PCT/US05/10886</b>	International filing date (day/month/year) <b>31 March 2005 (31.03.2005)</b>
Priority date (day/month/year) <b>31 March 2004 (31.03.2004)</b>	
International Patent Classification (IPC) or both national classification and IPC <b>IPC(7): D01D 5/12 and US Cl.: 246/441</b>	
Applicant <b>THE REGENTS OF THE UNIVERSITY OF CALIFORNIA</b>	

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I      Basis of the opinion
- ☐ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☐ Box No. VII      Certain defects in the international application
- ☐ Box No. VIII      Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Date of completion of this opinion <b>27 September 2005 (27.09.2005)</b>	Authorized officer  Joseph S. Del Sole Telephone No. (571) 272-1130
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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US05/10886

**Box No. I Basis of this opinion**

1. With regard to the language, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
- ☐ table(s) related to the sequence listing

b. format of material

- ☐ on paper
- ☐ in electronic form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
- ☐ filed together with the international application in electronic form.
- ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/10886

Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 18-26 YES

Claims 1-17, 27-31 NO

Inventive step (IS)

Claims NONE YES

Claims 1-31 NO

Industrial applicability (IA)

Claims 1-31 YES

Claims NONE NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/10886

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

**V. 2. Citations and Explanations:**

Claims 1-17 and 27-31 lack novelty under PCT Article 33(2) as being anticipated by Lee et al (6,616,435).

Lee et al teach an apparatus having a dispenser (Fig 1a, #31) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1a, #28) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1a, #50) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1a, #40) for charging the polymer dispersion; the source of potential is a direct current battery; the collector is grounded (Fig 1a); the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1-17 and 27-31 lack novelty under PCT Article 33(2) as being anticipated by Childs (2,338,570).

Childs teaches an apparatus (Fig 1) having a dispenser (Fig 1, #4) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #17) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #19) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1, #15) for charging the polymer dispersion; the source of potential is a direct current battery; the collector is grounded (Fig 1); the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1-10, 12-17, and 28-31 lack novelty under PCT Article 33(2) as being anticipated by Zarkoob et al (6,110,590).

Zarkoob et al teach an apparatus (Fig 1) having a dispenser (Fig 1, #10) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #13) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #11) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1, #12) for

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
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**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

charging the polymer dispersion; the source of potential is a direct current battery; the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1, 4-10, 12-15, 17, and 28-31 lack novelty under PCT Article 33(2) as being anticipated by Martin et al (4,878,908).

Martin et al teach an apparatus (Fig 1) having a dispenser (Fig 1, #1) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #5) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #2) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 18-23 and 25-26 lack an inventive step under PCT Article 33(3) as being obvious over any of the above Lee et al (6,616,435), Zarkoob et al (6,110,590), Childs (2,338,570) and Martin et al (4,878,908) in view of either of Park et al (6,267,987) or Chickering, III et al (6,308,434).

Lee et al, Zarkoob et al, Childs and Martin et al each teach the apparatus and method as discussed above.

Lee et al, Zarkoob et al, Childs and Martin et al fail to teach the method of using the apparatus including the material being a plurality of liquids and polymer, the polymer being a metastable dispersion of poly(lactic acid-co-glycolic acid) having biologically active molecules.

Park et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of creating a biologically active deliver compound. Chickering, III et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of achieving spray drying.

It would have been obvious to one having ordinary skill in the art at the time of the Applicant's invention to have modified the inventions discussed with the poly(lactic acid-co-glycolic acid) as the material used as taught by either Park et al or Chickering, III et al because such a well known compound is useful either as a drying agent or to create a biological delivery compound.

Claims 18-26 lack an inventive step under PCT Article 33(3) as being obvious over any of the above Lee et al (6,616,435), Zarkoob et al (6,110,590), Childs (2,338,570) and Martin et al (4,878,908) in view of Shastri et al (6,471,993).

Lee et al, Zarkoob et al, Childs and Martin et al each teach the apparatus and method as discussed above.

Lee et al, Zarkoob et al, Childs and Martin et al fail to teach the method of using the apparatus including the material being a plurality of liquids and polymer, the polymer being a metastable dispersion of poly(lactic acid-co-glycolic acid) having biologically active molecules and further utilizing sodium chloride.

Shastri et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of creating a biologically active deliver compound. Chickering, III et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of achieving spray drying.

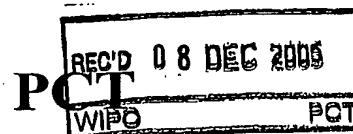
It would have been obvious to one having ordinary skill in the art at the time of the Applicant's invention to have modified the inventions discussed with the poly(lactic acid-co-glycolic acid) as the material used as taught by either Park et al or Chickering, III et al because such a well known compound is useful either as a drying agent or to create a biological delivery compound.

Claims 1-31 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
LISA A. HAILE, J.D., PH.D.  
DLA PIPER RUDEMAN GRAY CARY US LLP  
4365 EXECUTIVE DRIVE, SUITE 1100  
SAN DIEGO, CA 92121-2133



## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) <b>05 DEC 2005</b>	
<b>FOR FURTHER ACTION</b> See paragraph 2 below	
Applicant's or agent's file reference <b>UCLA1540WO</b>	
International application No. <b>PCT/US05/10886</b>	International filing date (day/month/year) <b>31 March 2005 (31.03.2005)</b>
Priority date (day/month/year) <b>31 March 2004 (31.03.2004)</b>	
International Patent Classification (IPC) or both national classification and IPC <b>IPC(7): D01D 5/12 and US Cl.: 246/441</b>	
Applicant <b>THE REGENTS OF THE UNIVERSITY OF CALIFORNIA</b>	

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I      Basis of the opinion
- ☐ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☐ Box No. VII      Certain defects in the international application
- ☐ Box No. VIII      Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Date of completion of this opinion <b>27 September 2005 (27.09.2005)</b>	Authorized officer  Joseph S. Del Sole Telephone No. (571) 272-1130
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Form PCT/ISA/237 (cover sheet) (April 2005)

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US05/10886

**Box No. I Basis of this opinion**

1. With regard to the language, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed  
☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing  
☐ table(s) related to the sequence listing

b. format of material

- ☐ on paper  
☐ in electronic form

c. time of filing/furnishing

- ☐ contained in the international application as filed.  
☐ filed together with the international application in electronic form.  
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/10886

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>18-26</u>	YES
	Claims <u>1-17, 27-31</u>	NO
Inventive step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-31</u>	NO
Industrial applicability (IA)	Claims <u>1-31</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet



WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/10886

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

**V. 2. Citations and Explanations:**

Claims 1-17 and 27-31 lack novelty under PCT Article 33(2) as being anticipated by Lee et al (6,616,435).

Lee et al teach an apparatus having a dispenser (Fig 1a, #31) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1a, #28) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1a, #50) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1a, #40) for charging the polymer dispersion; the source of potential is a direct current battery; the collector is grounded (Fig 1a); the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1-17 and 27-31 lack novelty under PCT Article 33(2) as being anticipated by Childs (2,338,570).

Childs teaches an apparatus (Fig 1) having a dispenser (Fig 1, #4) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #17) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #19) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1, #15) for charging the polymer dispersion; the source of potential is a direct current battery; the collector is grounded (Fig 1); the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1-10, 12-17, and 28-31 lack novelty under PCT Article 33(2) as being anticipated by Zarkoob et al (6,110,590).

Zarkoob et al teach an apparatus (Fig 1) having a dispenser (Fig 1, #10) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #13) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #11) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is connected to a source of electric potential (Fig 1, #12) for

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INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/10886

**Supplemental Box**

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charging the polymer dispersion; the source of potential is a direct current battery; the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 1, 4-10, 12-15, 17, and 28-31 lack novelty under PCT Article 33(2) as being anticipated by Martin et al (4,878,908).

Martin et al teach an apparatus (Fig 1) having a dispenser (Fig 1, #1) for containing an electrically charged polymer, the dispenser including a proximal end and a distal end, where the proximal end defines an orifice; an electrode (Fig 1, #5) positioned near the orifice, wherein the electrode and the orifice define a gap therebetween; a collector (Fig 1, #2) for receiving the oriented polymer fibers, wherein the collector is positioned at a distance from the gap; the dispenser is fabricated of glass; the orifice is a capillary tip; the orifice has a diameter between about 10 nanometers and 100 micrometers; a method for using the apparatus; the electric voltage applied to the electrode is between about 20 kV and 40kV wherein the distance between the gap and the collector is between about 10 centimeters and 30 centimeters.

The Examiner notes that claims to the material used in the apparatus (claims 4-10) do not further limit the apparatus.

Claims 18-23 and 25-26 lack an inventive step under PCT Article 33(3) as being obvious over any of the above Lee et al (6,616,435), Zarkoob et al (6,110,590), Childs (2,338,570) and Martin et al (4,878,908) in view of either of Park et al (6,267,987) or Chickering, III et al (6,308,434).

Lee et al, Zarkoob et al, Childs and Martin et al each teach the apparatus and method as discussed above.

Lee et al, Zarkoob et al, Childs and Martin et al fail to teach the method of using the apparatus including the material being a plurality of liquids and polymer, the polymer being a metastable dispersion of poly(lactic acid-co-glycolic acid) having biologically active molecules.

Park et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of creating a biologically active deliver compound. Chickering, III et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of achieving spray drying.

It would have been obvious to one having ordinary skill in the art at the time of the Applicant's invention to have modified the inventions discussed with the poly(lactic acid-co-glycolic acid) as the material used as taught by either Park et al or Chickering, III et al because such a well known compound is useful either as a drying agent or to create a biological delivery compound.

Claims 18-26 lack an inventive step under PCT Article 33(3) as being obvious over any of the above Lee et al (6,616,435), Zarkoob et al (6,110,590), Childs (2,338,570) and Martin et al (4,878,908) in view of Shastri et al (6,471,993).

Lee et al, Zarkoob et al, Childs and Martin et al each teach the apparatus and method as discussed above.

Lee et al, Zarkoob et al, Childs and Martin et al fail to teach the method of using the apparatus including the material being a plurality of liquids and polymer, the polymer being a metastable dispersion of poly(lactic acid-co-glycolic acid) having biologically active molecules and further utilizing sodium chloride.

Shastri et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of creating a biologically active deliver compound. Chickering, III et al teach that it is well known in the art to electrostatically utilize poly(lactic acid-co-glycolic acid) for the purpose of achieving spray drying.

It would have been obvious to one having ordinary skill in the art at the time of the Applicant's invention to have modified the inventions discussed with the poly(lactic acid-co-glycolic acid) as the material used as taught by either Park et al or Chickering, III et al because such a well known compound is useful either as a drying agent or to create a biological delivery compound.

Claims 1-31 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.